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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/507,079	02/18/2000	Masataka Kadowaki	10876.45US01	8450
23552	7590	03/23/2004	EXAMINER	
MERCHANT & GOULD PC			RIDLEY, BASIA ANNA	
P.O. BOX 2903			ART UNIT	PAPER NUMBER
MINNEAPOLIS, MN 55402-0903			1764	

DATE MAILED: 03/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/507,079	<b>Applicant(s)</b> KADOWAKI ET AL.	
	<b>Examiner</b> Basia Ridley 	<b>Art Unit</b> 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 7-12 is/are pending in the application.
- 4a) Of the above claim(s) 4, 10 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-9 and 12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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## DETAILED ACTION

### *Drawings*

1. The drawings were received on 30 December 2003. These drawings are acceptable.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim(s) 1-3, 7-9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Trocciola et al. (USP 5,330,727) in view of in view of De Rycker et al. (USP 2,887,365).

Regarding claims 1, 7 and 9 Trocciola et al. discloses a CO remover comprising:

- an air mixer (19) for mixing air with hydrogen-rich gas including CO to generate mixed gas;
- a selective oxidative catalytic device (20, 30) for selectively oxidizing the CO by having the mixed gas pass through a selective oxidative catalyst bed (22, 32);
- the selective oxidative catalytic device including a gas passing tube (21, 31) that has the selective oxidative catalyst bed (22, 32); and
- at least one gas blending unit (18, 24, 34), for blending part of the mixed gas that is passing through the selective oxidative catalyst bed (22, 32) further from an inner surface of the gas passing tube (21, 31) and remaining part of the mixed gas that is passing through the catalyst bed (22, 32) nearer to the inner surface of the gas passing tube (21, 31) at a point within the selective oxidative catalyst bed; wherein

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- the gas blending unit (24, 34) is formed from an element partially obstructing the gas passing tube (Fig. 1); and
- the element (24, 34) is circularly disposed around the inner surface of the gas passing tube (Fig. 1).

Additionally the reference discloses that it is desired to maintain the temperature of the of the catalyst within predetermined limit to avoid deactivation of catalyst (C1/L45-60) and to minimize the carbon monoxide in the hydrogen rich gas (C2/L35-39), but the reference does not explicitly disclose the gas blending unit being formed from an element projecting inward from the inner surface of the gas passing tube, wherein the element is a washer ring.

De Rycker et al. teaches a reactor for performing exothermic gas reactions (C1/L15-35) wherein the reactor comprises:

- a gas passing tube (3) that has a catalyst bed (4); and
- at least one gas blending unit (9), for blending part of the gas that is passing through the catalyst bed (4) further from an inner surface of the gas passing tube (3) and remaining part of the gas that is passing through the catalyst bed (4) nearer to the inner surface of the gas passing tube (3) at a point within the catalyst bed;
- further comprising a cooling unit (6) for cooling the catalyst bed from outside upstream form the gas blending unit (9);
- wherein the cooling unit (6) includes a channel adjacent to an outer surface of the gas passing tube (3), through which cooling medium passes (Fig. 1);
- wherein the gas blending unit (9) is formed from an element disposed so as to partially obstruct the gas passing tube (Fig. 1);

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- wherein the element (9) is circularly disposed around the inner surface of the gas passing tube (Fig. 1);
- wherein said element projects inward from the inner surface of the gas passing tube (Fig. 1);
- and
- wherein said element is a washer ring (Fig. 1).

Further De Rycker et al. teaches that the disclosed reactor structure offers an advantage of providing reactor with even temperatures throughout the catalyst bed and which provides more structure resistant to breaking and deformation (C1/L36-C3/L40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the CO remover of Trocciola et al. as taught by De Rycker et al. for the purpose of providing reactor with even temperatures throughout the catalyst bed and which provides more structure resistant to breaking and deformation.

Regarding claims 2-3 and 12, Trocciola et al. in view of De Rycker et al. disclose all of the claim limitations as set forth above. Additionally Trocciola et al. discloses the CO remover further comprising:

- a cooling unit for cooling the selective oxidative catalyst bed from outside upstream from the gas blending unit (C7/L11-31);
- wherein the cooling unit includes a channel adjacent to an outer surface of the gas passing tube, through which cooling medium passes (C7/L11-31); and
- wherein a length between a start of the selective oxidative catalyst bed in a direction of a flow of the mixed gas and the gas blending unit (18) is no shorter than 1/3 of a length between the start of the selective oxidative catalyst bed and the end of the selective oxidative catalyst bed

in the direction of the flow of the mixed gas (Fig. 1).

Regarding claim 8, Trocciola et al. in view of De Rycker et al. disclose all of the claim limitations as set forth above. Additionally Trocciola et al. discloses the CO remover wherein a portion of the internal sectional area of the gas passing tube is obstructed by the element. While the reference does not explicitly disclose the specific percentage of the internal sectional area which is being obstructed, the size of the element, and therefore the specific percentage of the internal sectional area which is being obstructed is not considered to confer patentability to the claims. As the amount of cooling provided to the remover is variable(s) that can be modified, among others, by adjusting said size of the element, and therefore the specific percentage of the internal sectional area which is being obstructed, with said cooling increasing as the size of the element and the specific percentage of the internal sectional area which is being obstructed is increased, the precise size of the element would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed size of the element and the specific percentage of the internal sectional area which is being obstructed cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the size of the element and the specific percentage of the internal sectional area which is being obstructed in the remover of Trocciola et al. to obtain the desired cooling (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

4. This application currently names joint inventors. In considering patentability of the

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claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

***Response to Arguments***

5. Applicant's arguments filed on 30 December 2003 have been fully considered but they are not persuasive.

6. The applicant argues that while the justification for combination of Trocciola et al. and De Rycker et al. is to provide the reactor with uniform temperature throughout the bed (as taught De Rycker et al.), Trocciola et al. desires the temperature at the inlet of the catalyst bed should be higher than the temperature at the outlet of said catalyst bed.

This is not found persuasive. When the element projecting inward from the inner surface of the gas passing tube of De Rycker et al. is installed in the reactor of Trocciola et al. it will not affect the desired temperature profile between the catalyst bed inlet and outlet (throughout the vertical plane of the reactor), but rather it will ensure that the temperature throughout the cross-sectional, horizontal plane of the catalyst bed is uniform. Said element ensures that the whole of the gaseous mixture must necessarily traverse the whole catalytic layer (see De Rycker et al., C3/L10-17). This ensures that there is uniform temperature in catalyst bed throughout the horizontal cross-section of the catalyst bed and avoids formation of hot-spots (see De Rycker et al., C1/L61-C2/L10).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the CO remover of Trocciola et al. as taught by De Rycker et al. for the purpose of providing reactor with even temperatures throughout the catalyst bed throughout the horizontal cross-section of the catalyst bed. Said modification will further provide structure more resistant to breaking and deformation.

***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453. The examiner can normally be reached on Monday through Thursday, from 9:00 AM to 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

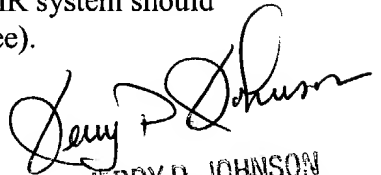
The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.



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Technical Center 1700 General Information Telephone No. is (571) 272-1700. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions on access to the Private PAIR system should be directed to the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

Basia Ridley  
Examiner  
Art Unit 1764

  
JERRY D. JOHNSON  
PRIMARY EXAMINER  
GROUP 1100

BR

March 16, 2004